DRAWING AMENDMENTS

The attached sheet of drawings includes changes to Figure 3. This sheet replaces the original sheet which included Figure 3. In Figure 3, previously omitted reference character 202 is added. In addition, this sheet is now labeled "3/6."

Attachment:

Replacement Sheet

REMARKS

Claims 1-31 were pending. All were rejected. By the above amendments, the applicants have amended claims 1, 24, 30 and 31 and added new claims 32-41. The applicants request further consideration and re-examination in view of the amendments above and remarks below.

Objections to the Drawings:

The drawings were objected to because page 3/6 of the drawings is referred to as page 4/6. The applicants have amended page 3/6 so that it is referred to as page 3/6.

The drawings were also objected to for not including reference character 202 for the surrogate's head. The applicants have amended Figure 3 to include the reference character 202.

The drawings were objected to because the reference characters 402 and 404 have both been used to designate "cylindrical section" on paragraph 37, lines and 6 and 8. The applicants submit that this informality relates to the written specification and not the drawings. The applicants have amended to the specification at paragraph 37 so that only the reference character 402 is used to refer to the "cylindrical section."

The drawings were also objected to because the reference character 106 has been used to designate both "near-infrared illuminators" and "surrogate" paragraph 26, line 1 and paragraph 28, line 10. The applicants submit that this informality also relates to the written specification and not the drawings. The applicants have amended to the specification at paragraph 28 so that the reference character 106 is used to only to refer to "near-infrared illuminators."

In view of the above amendments, the applicants respectfully request that the objections to the drawings be removed.

Objections to the Specification:

The specification was objected to as failing to provide proper antecedent basis for claim 17, lines 1 and 2: "said estimating comprising scaling the images." Claim 17 is dependent from claim 15 which is directed toward determining the level of the user's eyes. The applicants respectfully submit that the limitation of claim 17 finds proper antecedent basis in paragraph 57 of the applicants' specification where it

11

describes using image scale information to more accurately estimate the eye level of the user.

The specification was also objected to as failing to provide proper antecedent basis for claim 30, line 1: "program storage device readable by machine." The applicants have amended the specification at paragraph 30 and claim 30 to specify that the software program is encoded on a computer-readable medium. No new matter has been added since this subject matter is contained in paragraph 30 and in claim 30 as originally filed.

In view of the above, the applicants respectfully request that the objections to the specification be removed.

Rejections under 35 U.S.C. § 101:

Claim 30 was rejected as being directed toward non-statutory subject matter. Specifically, the limitation "program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine" is allegedly directed toward a program only. The applicants submit that this language of claim 30 will be understood to mean that the program storage device is encoded with the program, and that one of ordinary skill in the art would understand that a "program storage device readable by a machine" includes a computer-readable medium. Nevertheless, the applicants have amended claim 30 to recite the style of the Examiner's preferred terminology: "[a] computer-readable medium encoded with a program of instructions executable by a machine." As stated in the *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility* (Nov. 2005), "a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." Therefore, claim 30 is directed toward statutory subject matter.

In view of the above, the applicants respectfully request that the rejection under 35 U.S.C. § 101 be removed.

Rejections under 35 U.S.C. § 112:

Claim 14 was rejected as being indefinite because it is not clear as to how the method of directing the person's voice at a remote location is related to determining the angular orientation of an object. The applicants respectfully traverse the rejection.

12

First it is not necessary for a claim to fully explain *how* the claim might be implemented. Rather, the specification provides enablement for the claim limitations. Here, the applicants' specification at paragraph 28 explains that a speaker is positioned at each of the four corners of the surrogate's head and that, depending upon the angular orientation of the user's head, one or more of the speakers may be selected to direct the user's voice in a direction that corresponds to the angular orientation of the user's head. Therefore, claim 14 is enabled and is not indefinite.

Claim 24 was rejected as being indefinite as having insufficient antecedent basis for "the luminence values." The applicants have amended claim 24 to provide antecedent basis for this claim limitation.

In view of the above, the applicants respectfully request that the rejections under 35 U.S.C. § 112 be removed.

Rejections under 35 U.S.C. § 103:

Claims 1, 11-14, 18, 28, 30 and 31 were rejected as being obvious over U.S. Patent No. 7,068,856 to Albertelli et al. (hereinafter "Albertelli") in view of U.S. Patent No. 6,370,260 (hereinafter "Pavlidis"). Regarding claim 1, the office action stated that Albertelli teaches "a method for determining the angular orientation of an object (see Fig. 1) comprising: assigning values to a plurality of positions in a polar plot (25) using data from the images (10) wherein the polar plot has an origin; and computing a centroid (30) based on the assigned values wherein an angle of the centroid (55) with respect to the origin indicates the angular orientation of the object (see Cols. 2 and 3)." The office action stated that Albertelli fails to disclose obtaining a plurality of images of the object. However, the office action stated that Pavlidis teaches obtaining a plurality of images of an object at figure 2 and col. 4, lines 1-2. The office action stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Albertelli by obtaining a plurality of images "in order to be readily implemented, have minimal computational complexity, and retrieve similar imaging signals for various humans and/or objects despite their color."

The applicants submit that while Albertelli teaches determining an image orientation angle, there exists a fundamental difference between Albertelli and the applicants' invention. Particularly, Albertelli obtains a single image of an object and determines the orientation angle of the object *within the plane of the image*. This is

clear from figure 1 of Albertelli since the image data lies in the x-y plane and the determined angle θ also lies in the x-y plane. See also, Albertelli at col. 3, lines 12-67. In contrast, the applicants' invention is directed toward a technique in which multiple images of different sides of an object are obtained and the angular orientation of the object is determined in a plane that is *independent of the image planes*. This is clear from the applicants' specification since it describes obtaining images of the sides of a person's head and, from these images, determining the direction in which the person is facing. See applicants' specification at paragraphs 20 and 21.

The applicants have amended claim 1 to further clarify this difference. As amended claim 1 recites as follows:

1. (Currently Amended) A method for determining the angular orientation of an object comprising:

obtaining a plurality of images of the object;

assigning values to a plurality of positions in a polar plot using data from the images, ~~wherein~~the polar plot ~~has~~having an origin and data from each image being assigned to a corresponding sector of the polar plot; and

computing a centroid based on the assigned values wherein an angle of the centroid with respect to the origin indicates the angular orientation of the object.

Therefore, claim 1 requires that data from each of the plurality of images is assigned to corresponding sector of the polar plot. This limitation is supported by the Applicants' specification at least at paragraphs 20, 37 and figure 5.

Albertelli does not teach or suggest such a limitation. This is clear because Albertelli uses a single image to determine angular orientation with the plane of the image. Albertelli determines angular orientation from a two-dimensional array of discrete image values by calculating zeroth and first order moments of the values and then determining coordinates of the image centroid from the zeroth and first order moments. Albertelli at col. 3, lines 9-45. Next, second order moments are obtained from the image centroid coordinates and the orientation angle is determined from the second order moments. Albertelli at col. 3, lines 47-67.

Accordingly, Albertelli does not teach assigning values obtained from a plurality of images to a plurality of positions in a polar plot, nor does not Albertelli teach that data from each image is assigned to a corresponding sector of the polar plot.

Pavlidis also does not provide any suggestion to modify Albertelli in a manner that would meet all of the limitations of applicants' claim 1. Specifically, Pavlidis is directed toward detection of people and particularly to detection of occupants in vehicles for gather usage statistics for high occupancy vehicle (HOV) lanes. Pavlidis at col. 1, lines 3-13. To counteract effects of weather and optical properties of automobile windshields, the system of Pavlidis uses two cameras of different sensing wavelengths within the near-infrared spectrum. Pavlidis at col. 4, lines 1-30. The images from the two cameras are then "fused" and processed to achieve an image showing exposed skin parts as a binary "blob." Pavlidis at col. 4, lines 31-50. This binary blob image is said to aid in detecting the presence of a person in an automobile. Pavlidis at col. 4, lines 50-53

Therefore, it can be seen that Pavlidis is in an entirely different field of endeavor from that of Albertelli in that each solves a problem that is entirely unrelated to the problem solved by the other. As such, there would be no hint, teaching or suggestion to combine the references. However, for a valid rejection under 35 U.S.C. § 103, the references themselves must be considered as a whole and must suggest the desirability and, thus, the obviousness of making the combination. Manual of Patent Examining Procedure at Section 2141 (Aug. 2006).

For at least these reasons applicants' claim 1 is allowable over Albertelli and Pavlidis. Dependent claims 11-14, 18 and 28 are allowable at least because they depend from an allowable base claim 1.

Independent claims 30 and 31 recite limitations that are comparable to those of claim 1 that are missing from Albertelli and Pavlidis. Accordingly claims 30 and 31 are also allowable over Alberti and Pavlidis.

Dependent claims 2-10, 15-17, 19-27 and 29 are rejected in view of Albertelli in combination with Pavlidis and in various further combinations with ten other references. The applicants submit that each of these dependent claims is allowable at least because it depends from an allowable base claim. Further, each of these rejections depends upon Albertelli being properly combinable with Pavlidis. However, as explained above, Alberti and Pavlidis are not properly combinable.

Accordingly, further combinations of Alberti and Pavlidis cannot properly be made. For at least these reasons, claims 2-10, 15-17, 19-27 and 29 are allowable.

New Claims:

New claim 32 is an independent method claim which is directed to the same subject matter as original claim 1 except that new claim 32 specifies that the polar plot is in a plane that is independent of planes of the images. As explained above, this limitation is supported by the applicants' specification at least at paragraphs 20 and 21 where it describes obtaining images of the sides of a person's head and, from these images, determining the direction in which the person is facing. Also, figures 5-7 of the applicants' specification illustrate an example of a polar plot in a plane that is independent of the image plane of the cameras. As is also explained above, this feature distinguishes the claim from the primary reference Albertelli since Albertelli obtains a single image of an object and determines the orientation angle of the object within the plane of the image.

New dependent claims 33-41 recite subject matter of original claims 2, 4, 10, 12, 13, 14, 24, 25 and 28. Therefore, no new matter has been entered. New claims 33-41 are allowable at least because they depend from an allowable base claim 32.

Conclusion:

In view of the above, the Applicants submit that all of the pending claims are now allowable. Allowance at an early date would be greatly appreciated. Should any outstanding issues remain, the Examiner is encouraged to contact the undersigned at (408) 293-9000 so that any such issues can be expeditiously resolved.

Respectfully Submitted,

Dated: Jan. 10, 2007

Derek J. Westberg (Reg. No. 40,872)